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ABSTRACT

An interactional model explaining predisposition to hyperactivity asserts that being identified, diagnosed, and treated as hyperactive is a function of biological factors, early health and temperament, family characteristics, and the quality of the home environment. A longitudinal study involving 367 subjects, aged 17-18, tested the interactional model to determine the relative contributions of these factors during infancy, preschool, and elementary school years to a variety of adolescent outcomes. Patterns of individual characteristics and environmental process variables were found to be predictive of several adolescent outcomes. Early biological factors and the child's health and early temperament were predisposing for the adolescent mental health problems of depression, aggressive and nonaggressive conduct disorders, and hospitalization for psychological treatment. The effects of later familial, social, and cognitive factors were even more important in shaping educational outcomes. In other outcomes, such as substance use, delinquency, and alternate living situations, the early predisposing factors shared equally with the elementary school variables in explaining the outcomes. (Six pages of references and three tables are provided.) (JDD)

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Adolescent Outcomes for Hyperactive Children - Perspectives on General and Specific Patterns of Childhood Risk for Adolescent Educational, Social, and Mental Health Problems[1]

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This research on adolescent outcomes for hyperactive children is the outgrowth of longitudinal, prospective studies of the life histories of hyperactive, behavior problem control and random control subjects that has been underway since the subjects were in elementary school in the 1973-1974 year. Our research is one of a small number of investigations that has charted the developmental history of hyperactive children through their adolescent years, and it satisfies several important criteria for definitive longitudinal studies of hyperactive children (Thorley, 1984): 1) all of the subjects have been defined operationally identifying the basis and sources of criteria that are used in the diagnostic process; 2) the study uses a longitudinal framework rather than a follow-up or follow-back method; 3) life history patterns of children who were symptomatic in childhood can be compared with those with no early reported school or behavior problems; 4) unlike other samples of hyperactive children used in outcome studies, 22% of our subjects were girls; and 5) the subjects include a group of children with hyperactive symptoms during childhood who were never referred for nor treated for the condition, making possible a determination of whether or not there is any clinical validity to the condition generally called hyperactivity or more recently, Attention Deficit Disorder (ADD) with or without hyperactivity (H; overactivity) (American Psychiatric Association, 1980; 1987). We have used several criteria for describing subjects according to their presenting symptoms. Among the diagnostic criteria are parent and teacher measures of the DSMIII criteria of Attention Deficit Disorder, Hyperactivity, and aggressiveness, age of onset of symptoms, presence of a medical diagnosis of hyperactivity, and parent and teacher judgments of the extent to which the child was considered to be

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hyperactive in either or both the home and school environments. The measurement system maintained in case-integrated computer files provides a developmental picture of the subjects over time, and includes process measures of both the home and school environments from childhood through adolescence, individual characteristics of the subjects reflected in biological makeup, symptom characteristics, cognitive, social, and affective measures, and data on life events faced by the subjects as they grew from childhood to late adolescence.

For many years our knowledge of adolescent outcomes for hyperactive children was based primarily on follow-up studies, at adolescence, of youths identified as hyperactive early in their school lives, usually as clients seen in outpatient clinics. The general findings from prospective and retrospective studies (Huessy & Cohen, 1976; Huessy, Marshall & Gendron, 1973; Huessy, Metoyer & Townsend, 1974; Nichols & Chen, 1981; Safer & Allen, 1976; Satterfield, Hoppe & Schell, 1982; Sleator, Von Neumann & Sprague, 1976) were that hyperactive children did not grow out of their problems when they reached adolescence, but continued to experience behavioral and academic difficulties. Several follow-up investigations (Cantwell, 1985; Cohen, Weiss & Minde, 1972; Hechtman & Weiss, 1983; Hechtman, Weiss & Perlman, 1984; Mendelson, Johnson & Stewart, 1971; Menkes, Rowe & Menkes, 1967; Minde, Weiss & Mendelson, 1972; Weiss, Hechtman, Milroy & Perlman, 1985; Weiss, Hechtman & Perlman, 1978) reported such continuing problems as delinquency, poor school achievement, and low self esteem for hyperactive adolescents. These outcomes were shown to be related to familial history, treatment variables, achievement, developmental data and childhood symptoms; questions logically followed regarding the extent to which the outcomes were an outgrowth of hyperactive symptomatology or other presenting problems. In partial response, investigators observed (August, Stewart & Holmes, 1983; Loney, Kramer & Milich, 1981; Loney & Milich, 1982) that many hyperactive children's aggressive behavior was ignored during a diagnostic appraisal and recommended that hyperactivity and aggressiveness should be studied concurrently. Since children who were both hyperactive and aggressive were more likely to be aggressive as adolescents, they raised serious questions about whether it was the hyperactive symptoms that were related to adolescent outcome, or the early manifestations of aggressive behavior, which often occurred in conjunction with the hyperactivity.

Recent studies have addressed additional issues about whether or not hyperactive children who are at risk for persistence of Attention Deficit Disorder (ADD) symptoms or aggressiveness during adolescence also are at risk for later psychopathology (Cantwell, 1985; Gittelman, Mannuzza, Shenker & Bonagura, 1985; Weiss, Hechtman, Milroy & Perlman, 1985). Using a subsample of hyperactive and control boys matched for SES and age, Lambert, Sassone, Hartsough and Sandoval (1987) reported that among those who were hyperactive as children, 20% were asymptomatic during early adolescence, 37% continued to have problems but were no longer hyperactive (residual hyperactive), and 43% continued to be hyperactive and receive medical treatment for the condition. Lambert et al. also added to the knowledge about the social and mental health risks faced by hyperactive children during the elementary school years for particular educational, mental health, and social outcomes. By age 14 nineteen percent of the subsample of hyperactive boys, as opposed to 3% of the controls, had had trouble with law enforcement agencies, 14% of the hyperactives compared with 2% of the controls had been suspended from school more than once, and 5% of the hyperactives as compared with none of the controls had been committed to a juvenile facility. In addition to conduct problems and delinquency, two hyperactives had attempted suicide, one had attempted murder, five had attempted repeatedly to break in and enter households, and two had been placed in psychiatric institutions.

From the beginning, our research has been guided by a general theoretical model that posits that the development of symptoms, being identified, diagnosed, and treated for hyperactivity, the course of the condition over time, and ultimately outcomes at adolescence and adulthood can be explained best from an interactive perspective. The model asserts that early individual characteristics and environmental process variables predispose subjects to developing hyperactive symptoms and being identified and treated for hyperactivity. Similarly, individual characteristics, process variables and life events over the developmental period (Sandoval, Lambert & Sassone, 1980) affect outcomes at early and later adolescence. Although the model is specific to the design of our research on early hyperactivity and its related outcomes, the approach is consistent with that proposed by several other investigators (Loney, 1980; McMahon, 1980; Rie & Rie, 1980; Werner, 1980; Whalen & Henker, 1980).

For the purposes of our longitudinal work, we have defined the structure of the domains and developed valid and reliable measures of individual characteristic and process variables (Lambert, 1982; Hartsough & Lambert, 1982; 1985). Preliminary tests of the interactional model (Lambert & Hartsough, 1984) have demonstrated that being identified, diagnosed and treated as hyperactive is a function of biological factors, early health and temperament, family characteristics, and the quality of the home environment. In this investigation we test our model further to provide evidence on the relative contributions of these factors at infancy and pre-school and later in the elementary school years to a variety of adolescent outcomes. In the effort to explicate patterns of factors for each outcome, we hope to contribute knowledge about the relative merits of general versus specific conceptual models for early and middle childhood risk for adolescent outcomes.

The first objective of the investigation was to determine whether or not several educational and mental health outcomes, conduct problems, and substance usage rates at the end of high school differed for subjects who were hyperactive as children. A second major objective was to examine the subjects' hyperactive symptom status in conjunction with the contributions of infancy and pre-school factors, including the child's early biological and psychological status, the factors characterizing the child's home environment, and the child's cognitive and social characteristics in explaining outcomes at age 17-18. Of interest in this second objective was the extent to which one or more of the outcomes could be explained by this childhood symptom picture in conjunction with general or specific process variables. If these analyses showed that the patterns of contributions of the domains of individual characteristics and process variables were similar across categories of outcomes the results would imply that there is a common rather than specific pathway from infancy through early childhood through middle childhood to outcomes at age 17-18. On the other hand if the patterns of individual characteristics and process variables differed, the results would suggest that specific patterns of childhood risk must be defined for each outcome. The goal is to produce analyses for the second objective that will provide preliminary evidence on the contributions by individual and environmental variables across outcomes as well as to examine the contributions of the hyperactive symptom profiles of ADD, overactivity (H), and aggressiveness.

Method

Subjects

The longitudinal data on which this study is based contains the records of 367 subjects among which were 166 who were diagnosed and treated as hyperactive during childhood, 74 behavior controls who had either or both symptoms and behavior measures of hyperactivity but who were never considered to be hyperactive nor treated for it, and 127 subjects who were in the same schools as the hyperactive and behavior controls but who were asymptomatic as children. These subjects and the criteria for identification have been described in detail elsewhere (Lambert, Sandoval & Sassone, 1978; 1981; Sandoval, Lambert & Sassone, 1980).

At ages 17-18 outcome data were available from at least one reporting source (subject, or parent, or school counselor) for 82% of the original sample, and available from all sources for 64% of the original sample. For those instances in which it was impossible at ages 17-18 to speak with the subject directly, outcome data were obtained from a parent and/or school counselor. By and large, the causes of subject nonparticipation were due to the fact that a number of them had run away from home, left school, were in jail, in foster care, or in psychiatric institutions. Our attrition rates are in line with those reported by other investigators. Weiss, et al (1978; 1979) reported a loss of 13% of their hyperactive subjects over a 5 to 8 years period and a loss of 27% over a 14-17 year period (1985). August, Stewart & Holmes (1983) were able to reach 68% of their hyperactive subjects at follow-up and Gittelman, et al (1985) had data from parents and subjects on 79% of their cases.

To check the possibility of selective attrition, behavior rating scores at the time the subjects were identified were compared by birthyear, gender and by hyperactive or control status. Results of these tests suggested no difference between those with outcome data and those whose status was unknown at age 17. Only 4 of 60 tests computed showed statistically reliable differences ($p \leq .05$) thereby indicating the absence of selective bias among the subjects for whom these data are reported.

The hyperactive, behavior control and control subjects were classified by two methods to determine the significance of outcomes for the hyperactive children.

Definition #1 - Hyperactive and Controls: Subjects satisfied the definition of hyperactive if 1) they received a medical diagnosis of hyperactivity and were treated for the condition, 2) both parents and teachers considered the child to be hyperactive in the home or school environment, and 3)the onset of symptoms occurred before the age of 7; other subjects were designated as controls.

Definition #2 — Pervasive, Situational or not ADDH; Pervasive, situational or not aggressive (A): Subjects were classified by this definition if they were pervasively hyperactive (Sachachar, Rutter & Smith, 1981) based on scores in a cut-off region on the ADD and H scales from both the *Behavior and Temperament Survey - Home Version (BTS-H)* (Lambert & Hartsough, 1987; Lambert, Hartsough & Sandoval, in press[a]) and the *Behavior and Temperament Survey - School Version (BTS-S)* (Lambert & Hartsough, 1987; Lambert, Hartsough & Sandoval, in press[b]). Subjects were classified as situationally hyperactive if one or the other of the parent or teacher scores was in the cut-off region. Those subjects with neither score in the cut-off region were considered not ADDH regardless of whether or not they satisfied the criteria for Definition #1. Subjects were defined as pervasively aggressive if both parent and teacher *BTS* aggressive scale scores were one standard deviation above the mean of the norm reference group, as situationally aggressive if either the parent or teacher rating was in this region and not aggressive if neither score was in the region.

In pursuit of the second and third objectives, to analyze the contribution of individual differences and environmental factors by outcomes, specific descriptive symptom characteristics or diagnostic indicators associated with hyperactivity including aspects of Defintion H_1 and H_2, were assigned to each of the subjects for the regression analyses. These were 1) judged by social system definers - parent, teacher, and physician - to be hyperactive; 2) rated as pervasively aggressive on the *BTS-S* and the *BTS-H* scales; 3) rated as pervasively overactive (hyperactive) on the *BTS-S* and *BTS-H* scales; 4) rated as pervasively ADD (Attention Deficit Disorder), not overactive on the *BTS-S* and *BTS-H.*; 5) symptoms of hyperactivity first noted before age 7; 6) first stimulant medication before age 7; 7) first non-medical intervention before age 7; and 8) number of years on stimulant medication.

Measurement of Outcomes

The following sets of outcome data were collected at the time each subject was a senior in high school or at the age of 17-18. Sources of outcome data included

subject interviews and assessments, counselor reports of educational status and attainment, and interviews with parents regarding the subject's status.

Educational Outcomes

1. Attended special school: any one of the following—continuation school, pregnant minors school, special residential school —was present in 12.8% of total sample

2. Completed high school: Graduation from high school or passed G.E.D—was attained by 66.7% of the subjects.

3. Attended college: Characteristic of 33.8% of the subjects.

Conduct Problems

4. Left school or ran away: any one of the following—ran away from home, left or missing from school, teenage parenthood—was present among 10.6% of the subjects.

5. Living away from home: any one of the following—group/foster home, residential setting for special problems, own household, living with friends, or whereabouts unknown to parents—characterized 10.4% of the sample.

6. Adjudicated delinquent: any one of the following—on probation, in jail, assigned a social worker by the court—was present among 8.7% of the subjects.

Mental Health Difficulties

7. Conduct Disorders—Aggressive: Subject reports of frequencies of acts of violence against property or people - grouped according to DSM111 (APA, 1980) criteria for aggressive conduct disorders using items from Gold (1970) and Johnston (1973) as applied by Kellam, Ensminger & Simon (1980) in their self report instrument, "What's Happening."

8. Conduct Disorders—Nonaggressive: Subject reports of frequencies of truancy, lying, and rule violations from Gold and Johnston in the "What's Happening" inventory following criteria in DSM111 for nonaggressive conduct disorders.

9. Depression: Score of 16 or higher on the CES-D Scale (Radlov, 1977) occurred in 37% of the cases.

10. In-patient or out-patient psychological treatment: either of the following—admitted to a psychiatric institution, hospital out-patient receiving psychological treatment—was present among 2.7% of the sample.

Substance Use

11. Cigarettes: 7% of the subjects smoked a pack or more of cigarettes a day.

12. Hard Liquor: 22% of the subjects used hard liquor more than 40 times in the past.

13. Marijuana: 34% of the subjects used marijuana more than 40 times in the past.

14. Hard Drugs: 10% of the subjects used any single illegal substance (amphetamines, barbiturates, cocaine, heroin, inhalants, psychedelics more than 40 times in the past.

15. Poly drug use: 13% of the subjects used any three or more illegal drugs more than three times in the past.

More subjects were characterized by single rather than multiple outcomes. Among those subjects who did not finish high school, 69% had been assigned to special schools, 67% were marijuana users, and 56% used hard liquor. For those who reported aggressive behaviors, 61% also reported nonaggressive acts, and 23% of them were adjudicated delinquents. The rates of joint occurrence were lower for other comparisons. Among those who reported symptoms of depression, 21% also went on to college, 13% failed to finish high school, and 15% reported aggressive behavior. The rates of outcomes and their joint patterns supported the treatment of each of these outcomes as independent occurrences in this exploratory analysis.

Measures of Individual Characteristics and Environmental Process Factors at Time Period 1 - Infancy and Pre-school .

These measures were defined from studies (Hartsough & Lambert, 1982; Lambert & Hartsough, 1984) describing, in part, biological predisposing factors as well as family characteristics during the period of life before the start of formal schooling.

Pregnancy influences. Among questions in the parent interview related to pregnancy were several inquiring about the mother's health during pregnancy, labor and delivery, and fetal characteristics. Also included were questions about the mother's use of various substances during pregnancy.

Child's health and temperament. In this domain, we were interested in determining the child's predisposition to psychological symptoms, including hyperactivity. We included reports of early health problems and reports of the child's temperament (Lambert, 1982; Thomas, Chess & Birch, 1970; Thomas and Chess, 1977).

Family characteristics and stability. This cluster of variables included measures of social characteristics of the family that could be associated with early school difficulties, as well as sociological indices that are often reflected in research on educational and social outcomes at adolescence. The variables are ethnic status, evidence of early family disruption, number of children in the home, number of prior moves, single parent families (based on classification proposed by Kellam, Ensminger & Turner, 1977), and socioeconomic status of the family coded according to father's occupation (Hollingshead and Redlich, 1958).

Measures of Individual Characteristics and Environmental Process Factors at Time Period 2 - Early Elementary School

Environment and familial factors. The measures for this domain were derived from Hartsough and Lambert's (1982) extensive factor analyses of the parent interview data. They provided a complete description of the data, the dimensionality of the environmental process domain reflected in parent's evaluation of and aspirations for the child, involvement of the parent with the child's early reading, time devoted to the child, and parent-child interactions around schooling and discipline practices.

Parent legal drug use and drug attitudes at the time of identification. This domain included two types of information: 1) parental life style regarding the use of proprietary substances for pain, distress, sleeplessness, or anxiety as well as 2) three factors based on interview questions about parental attitudes regarding society's laws and regulations about drug use; questions about preferred or approved methods of treatment for hyperactivity including stimulant medication; attitude toward

hyperactivity medication; attitude toward teen drug use; and opinion about laws for illegal drugs.

Social relationships. From child interviews and peer and self-ratings of the *School Play* (Lambert & Bower, 1979), we developed measures of the child's perceptions of peer interactions, the percentage of positive peer perception, and a measure of positive and negative self concept. Validity data for the peer and self ratings can be found in Lambert, Hartsough & Bower (1979), and elsewhere (Lambert, 1972, 1981; Lambert, Hartsough & Zimmerman, 1976).

School behavior problems. The Pupil Behavior Rating Scale (Lambert & Hartsough, 1973, 1979; Lambert & Nicoll, 1976; Lambert & Urbanski, 1980) is a set of 11 anchored rating scales assessing school behavior attributes that can be reliably and validly grouped into three dimensions: 1) classroom adaptation - the extent of difficulties in adapting to the demands of the learning situation in the classroom; 2) interpersonal problems - acting out/aggressive behavior; and 3) intrapersonal problems - withdrawn and shy.

Cognitive and academic characteristics. In this set of individual difference factors, the variables were the WISC-R IQ score (Wechsler, 1974) the PIAT (Dunn & Markwordt, 1970), measures of operational and formal reasoning from Piagetian clinical interview items developed by Tuddenham (1970; 1971) and two measures of attention and concentration - a long form of the WISC-R Coding Test and a double length Digit Span (Sandoval, 1977; Spring, Yellin & Greenberg, 1976).

Data Analysis Procedures

Before proceeding with the data analysis the first step was to determine whether or not the birthyear cohort of the subject was related to outcome status. ANOVA of birthyear by outcome indicated that there were no cohort effects for any of the above outcomes so we combined all subjects for the subsequent data analyses. The next step was to report on the significant differences, if any, between subjects according to hyperactivity status. In these analyses we used Definitions 1 and 2, as defined previously, and provided the significance of the F tests of the differences in outcomes between the groups. For definition 2 significance of post hoc contrasts provided information about the relative importance of ADDH and aggressive symptoms for each outcome.

For the second objective, to ascertain whether or not each set of factors at infancy and pre-school and later during elementary school contributed to the outcomes for the subjects at the end of high school, we conducted separate, stepwise, multiple regression analyses (Cohen & Cohen, 1975; Kandell, Kessler & Margulies, 1978) for each cluster of variables. Two criteria governed the entry of variables in the stepwise procedure: a variable had to contribute 1% of the variance not accounted for by the other independent variables in the equation and achieve a probability of $p \leq .05$ associated with the F-ratios computed at each successive step of the analysis. This result reduced the number of variables for the next step in the data analysis.

The final step used the identified variables from each cluster in an omnibus multiple regression to determine the cumulative explained variance in each outcome accounted for by the selected set of variables in all clusters entered into the equation according to our conceptual scheme, or in order of their presumed occurrence in the life history. Of particular interest in these final analyses was the extent to which hyperactivity symptoms, ADD, and overactivity (H) contributed variance to outcome, and in turn whether or not the evidence taken collectively supported assumptions about hyperactivity as a clinical entity.

Results and Discussion

Outcome Differences for Hyperactive Subjects

Table 1 provides data on tests of differences between outcomes for subjects defined operationally by Definition #1 or by Definition #2. Both children who are hyperactive by social system definers as well as those who are rated as pervasively ADDH with or without ratings of pervasive aggressiveness have significantly different educational and conduct outcomes as compared to their respective control groups. They more frequently attended special schools, did not finish high school and failed to go on to college, more frequently left school or ran away, lived away from home in a foster care or residential setting, and were more often adjudicated delinquents. Behavior ratings of ADDH and a diagnosis of hyperactivity are both related to later educational failure and social deviance. Subjects rated only as pervasively aggressive on the other hand, also differed from controls on high school graduation and college attendance.

Subjects classified by social system definers differed on the mental health outcomes of aggressive behavior and in-patient or out-patient psychological treatment. When the subjects were defined by behavior ratings, subjects who were either pervasively ADDH or pervasively aggressive differed on nonaggressive conduct disorders, while any combination of these pervasive symptoms characterized subjects who were aggressive. Subjects classified by Definition #2 did not differ on psychological treatment outcomes.

Children who are diagnosed and treated for hyperactivity smoke more cigarettes than age peers. This finding was earlier reported by Hartsough and Lambert (1987) in a study of the progression of drug use from legal to non-legal substances. Adolescent usage rates for other substances were not significantly different for diagnosed and treated hyperactive subjects. Cigarette smoking was not reported more frequently for any group of subjects defined by behavior rating criteria. The use of any hard drug more than 40 times prior to the outcome interview was significantly different for the pervasively ADDH subjects when compared to subjects whose ratings were not in the critical ranges.

These results suggest that educational, conduct problems, and mental health outcomes were significantly different for subjects classified by definition #1 or childhood diagnosis and treatment for hyperactivity. Such outcomes were also significantly different as compared to asymptomatic subjects for those who were both pervasively ADDH and pervasively aggressive, as well as different in some instances for subjects who were only pervasively ADDH. Tentatively, one can infer that childhood aggressiveness does not account solely for adolescent aggressiveness, but must be present with ADDH. In the case of educational outcomes, the data suggest that the severity of either or both symptoms of ADDH or aggressiveness affects later educational status. The picture regarding substance use outcomes is less clear. Other factors probably interact with these childhood symptoms to affect adolescent substance use rates.

Individual Characteristics and Environmental Process Factors Associated With Outcomes at Two Developmental Periods

Our conceptual framework has considered the Time 1 variables as acting sequentially and prior to the diagnosis of hyperactivity and related problems. At Time Period 2, elementary school years, our explanatory scheme assumes that the

contributions to hyperactive symptom formation and medical intervention are shared by early temperament characteristics, the ongoing family environment, (Lambert & Hartsough, 1984) as well as attitudes toward particular interventions for behavior problems. The other domains in Time Period 2 reflect social relationships in school, evaluations of children's behavioral accommodation to the school environment, as well as their cognitive attainments. Although we make no claim for whether or not these attributes precede or succeed the emergence of hyperactive symptomatology, they are presented in Table 2 subsequent to the measures and diagnosis of hyperactive symptoms. The actual order of these clusters of variables does not affect their contributions to outcomes displayed in Table 2, but when the analysis of their cumulative explained contributions are presented in Table 3, the order will affect the results.

Table 2 displays in Roman type the univariate correlation of variables within each cluster of dispositional and process factors that survived the stepwise multiple regression solution for each outcome. The other variables listed in Italics in each set correlated with outcomes at the $p \leq .05$ level but did not meet the stepwise criteria. The table also lists total variance accounted for by all the variables and the variance accounted for by the selected variables in each cluster.

Centering attention on the patterns of predictors over all outcomes (examine the rows) provides preliminary evidence about whether early risk for educational, social, mental health, or substance use outcomes is specific to outcome or whether there are particular patterns of dispositional and process variables that place a child at risk generally. For examples of selective prediction across outcomes, gender contributed significant variance only to mental health outcomes - aggressive and nonaggressive conduct disorders and to depression. Boys were more likely to have conduct disorders and girls were more likely to be depressed at ages 17 and 18. Within the pregnancy influences cluster across outcomes, prematurity and low birth weight were variables associated with liquor, marijuana, and hard drug use. As well, the mothers of adolescents who smoked more than one pack of cigarettes a day also smoked significantly more during the subject's gestation period. Conditions occuring during pregnancy were salient predictors for substance use, but not other outcomes.

Within the child's health and temperament cluster, the most potent predictor over several outcomes was the number of serious accidents the child had during

infancy and the pre-school periods. Of critical importance to the question of the clinical validity of hyperactivity or ADD was that the number of serious accidents was significantly related to nearly all of the outcomes that were different for the hyperactive subjects defined by the pervasiveness of the ADD symptoms, lending support to the interpretation of accidents and injuries early in life as an early manifestation of hyperactive symptomatology, possibly a forerunner of later impulsivity. Moreover, this result leads to the hypothesis that some personal dispositions, i.e., early childhood symptoms of ADD, place children generally at risk for educational, and social failure and mental health difficulties at adolescence. The largest amount of explained variance predicted for any outcome by the health and temperament cluster was for depression and non-aggressiveness. Subjects who reported depressive symptomatology at age 17-18 were reported by their mothers, as infants, and during the pre-school period to be moody (complaining, emotionally upset, nightmares), to have problems in coordination, to have a high activity level, but not to be delayed in the achievement of motor milestones. On the other hand non-aggressive behavior was predicted by the number of serious accidents and surgeries. The findings from analysis of this domain of predictors suggest that risk status during childhood may need to be understood as having both a specific as well as a general component.

In the third predispositional cluster, "family characteristics and stability," ethnic status did not survive the stepwise criteria for entry, but family disruption, number of schools attended, number of family moves, and low socioeconomic status were variables selected for the mental health and conduct problem outcomes. Variables in this cluster generally were not salient predictors of educational outcomes, contrary to longstanding beliefs that low socioeconomic status and family disruption are critical risk factors for poor educational futures.

At Time Period 2—elementary school years—home environment and familial process factors were powerful predictors (more than 10 percent of explained variance) of completing high school, going on to college, living away from home and marijuana use although the patterns of salient predictors varied across outcomes. These data suggest that environmental process variables, such as the quality of the home environment and parent-child interactions, as opposed to socio-economic indices, are critical factors to investigate in the explanation of childhood risk for some adolescent outcomes.

The cluster "parent legal drug use and attitudes," is hypothesized to cause parents to be more likely to seek medical diagnosis and intervention to ameliorate a child's behavior problems and is also conceptually prior to the identification of the child as hyperactive. Such parental attitudes can also be related to outcomes at adolescence. The data analysis showed that positive attitude toward treatment of hyperactivity with medical interventions was correlated significantly with both educational and conduct problems, outcomes that were, in turn, significantly different for the hyperactive subjects defined on the basis of pervasiveness of ADDH in Table 1. Parent use of diet pills explained the largest amount of variance among the variables in this cluster for adolescent hard liquor use, and a liberal parental attitude toward teenage drug use was the selected variable for later marijuana use. The total amount of variance explained by these variables for selected outcomes indicates that parental substance use lifestyle and attitude makes a small, but important contribution to selected adolescent outcomes.

The cluster "Identification and Treatment for Hyperactivity" in Table 2 includes measures of the pervasiveness of ADD without overactivity (hyperactivitiy), the pervasiveness of overactivity, and the pervasiveness of aggressiveness. This grouping of symptoms in contrast to the symptom combinations used in Definition #2, permits an analysis of the independent contribution of each of these three symptoms, and their salience for each outcome. The data show that ADD, overactivity, and aggressiveness are all correlated with the outcomes for which there were significant differences in Table 1. The patterns of salient variables across outcomes, however (those listed in Roman type) suggest the differential elative importance of ADD, overactivity, or aggressiveness in an early determination of adolescent risk. The results on Table 1 indicate that children who met the standards for Definition #1 or Definition #2 are at risk for a variety of adolescent outcomes, offering support for the clinical validity of the syndrome. The data in Table 2 inform us about the relative weights of these three symptoms in conjunction with others in the cluster in predicting outcomes. Collectively, the data presented in Table 1 and Table 2 offer equivocal evidence about the clinical validity of hyperactivity or ADD. To clarify the clinical validity of the syndrome, one would need to develop another definition of the condition that incorporated the early childhood health and temperament factors that appear to be precursors of hyperactivity in conjunction with childhood measures of ADD symptomatology, and

then to assess the unique contribution of this definition in predicting outcomes, in contrast to the contributions of either Definition #1, or Definition #2.

The remaining clusters of variables in our analysis provide a perspective on social relationships, school behavior problems, and cognitive and academic status of the subjects irrespective of their ADD symptom status. A positive peer rating of the subjects by their classmates was a powerful common predictor among the social relationship variables across outcome groups, replicating the work of many others that poor social relationships in schools is a general risk marker for poor outcomes at adolescence. A negative self concept was selected for all of the substance use variables, as well as for frequency of aggressive and nonaggressive conduct disorders, indicating that negative self concept is possibly a more specific rather than general risk factor. Depression was the only outcome for which significant variance was not accounted for by variables in the social relationships cluster.

Among the school behavior problems as defined by the *Pupil Behavior Rating Scale*, the interpersonal problems dimension was the most common predictor. Children who reported frequent aggressive conduct at age 17-18 were not only rated by teachers as having problems getting along with others, but also as being withdrawn and shy (having intrapersonal problems.) None of these variables was a significant predictor of depression, reflecting the likelihood that adolescents with depressed symptoms deviate as children toward neither extreme on teacher or peer ratings, nor on self reports of social relationships. This suggests the possibility that behaviors indicative of depression later on are not observable in the school setting.

Cognitive and academic status measures explained educational outcomes and conduct problems but did not have robust predictive power for aggressive and nonaggressive conduct disorders nor for substance use. Among the measures in the cognitive and academic cluster, the PIAT in contrast to the WISC-R IQ achievement score was the more salient predictor. Adolescents who reported depressive symptoms lagged behind age peers in cognitive development as reflected in performance on reasoning tasks, as well as achievement and mental ability. The Digit Span and long form Coding tests, selected as measures of attention and concentration, contributed significant variance to those outcomes for which children who were hyperactive or ADD were most at risk, adding some additional support to the potential validity of the ADD and hyperactivity symptom picture.

Cumulative Explained Variance in Outcome Over the Life Course from Infancy to Early Childhood .

In the research we have reported here, the data analysis strategy has been to treat risk factors within clusters of individual characteristics or environmental process variables sequentially and additively at each developmental period for each outcome of interest. The explained variance of the selected variables for each outcome within each cluster shows the strength of the cluster for each outcome. The results in Table 2 support the findings of other investigators that there are general characteristics of children such as ADDH, or aggressiveness that predispose them to several critical adolescent outcomes, but the data also indicate that approaching risk for education, conduct problems, mental health, or substance use outcomes from a general perspective would fail to acknowledge that pathways to outcomes have specific individual and environmental components weighted differently according to outcome. The comparative utility of specific versus general models of risk provide the impetus to studies of the differential effects of interventions aimed to ameliorate general risk factors with those that target specific risk factors.

Thus, the final step in our data analysis was to assess the cumulative effects of risk factors over two developmental periods in the life course of the subjects on whom rest these initial findings from our prospective research. Table 3 shows the overall and the successive cumulative contributions of the predispositional and early childhood mediational clusters to outcome. Table 3 provides information on the proportion of variance explained by each additional cluster of variables taken in order according to the conceptual model that guided the data analysis.

An initial step toward interpreting the Table 3 data is to examine the relative contributions of the infancy and pre-school clusters to the contributions of variables occurring at a later developmental period. The variance in mental health outcomes, for example, is attributable to a greater extent to factors operating at the infancy and preschool developmental period than to factors occurring during the elementary school years. This result makes a strong case for biological and early family factors having significantly greater explanatory power than events and behaviors during the school years for these mental health outcomes. On the other hand, the Time 1 infancy and pre-school clusters have relatively less influence on educational outcomes, in contrast to the contribution of Time 2 clusters. Explanation of conduct problems and substance use is shared equally by both the Time 1 and Time 2

components. These results are consistent with Werner and Smith (1977; 1982) who have shown that early health risk for selected outcomes can be moderated by family and school experiences.

Concluding Observations

Models that have been proposed to explain the relationship among risk factors to outcomes have included sets of variables comparable to those that we have used in this investigation. One proposed set of variables reflect individual characteristics or personal dispositions (Dohrenwend, 1986), what Kellam & Werthamer-Larsson (1987) refer to as psychological status and biological variables, or what Sameroff (1987) calls constitutional factors. Another set of variables are environmental process variables, defined as ongoing social situations by Dohwenrend, as characteristics or social fields and social task demands by Kellam and Werthamer-Larsson, or as the environment by Sameroff. Each of these investigators considers the developmental period during which the variables operate in their risk models, and all of them directly or indirectly support the notion that the degree of risk or protection against risk is additive at a particular developmental period and cumulative over several developmental periods. Although these and other writers vary in the extent to which they deal with interactive effects of personal dispositions and environmental process variables, each of their models involves the concept that risk at any developmental period is reflected by the number of risk factors present during that period as well as the cumulative effects of risk factors occuring at an earlier period in the life course. Rutter (1987) and others indicate that risk models need to include protective factors that insulate the individual from, or mediate the risk, in addition to measures of proneness or risk for outcomes. Rutter goes further, however, by suggesting that risk factors may be not only cumulative, but multiplicative in that with each increase in applicable risk factors for a particular child, the overall risk is increased multiplicatively as well.

From these analyses, we have identified patterns of individual characteristics and environmental process variables that are predictive of several adolescent outcomes. The results imply that reducing vulnerability and protecting against cumulative risk in the developmental period must take into account the particular factors that are most relevant for the outcomes of interest. As the data reported here have not examined the contributions of stressful life events (Dohrenwend, 1986) nor personal characteristics or process factors characterizing a later developmental

period, we are not in a position to demonstrate the cumulative effects of the total domain of risk factors over the life course from infancy through childhood and adolescence. We have indicated, however, that the data strongly support the inference of early biological factors as measured by pre, peri, and post natal conditions, as well as the child's health and early temperament as predisposing for adolescent mental health problems of depression, aggressive and nonaggressive conduct disorders and hospitalization for psychological treatment. In contrast these biological factors contribute far less in shaping educational outcomes when compared to the effects of later familial, social and cognitive factors. In other outcomes, such as substance use, delinquency, and alternate living situations, the early predisposing factors share equally with the elementary school variables explanations of risk.

Although we can make no unequivocal statements about whether or not the data support conclusively the existence of hyperactivity or ADD as a meaningful clinical syndrome, these data strongly suggest that early behavioral manifestations from which one can infer the clinical picture of hyperactivity as well as childhood symptoms of ADDH in conjunction with aggressiveness are significantly associated with educational, and mental health outcomes as well as adolescent conduct problems.

Recently Rutter (1987) has reminded us that the focus of attention should be on processes that counter risk factors and result in better adaptation, rather than continued risk. In the search for protective factors, particular attention needs to be paid to the mechanisms operating at key turning points in children's lives when the processes that place children at risk may be altered. In the work reported here, we have identified a number of interesting pathways to outcome at age 17-18 over children's developmental periods from infancy through early childhood. The fact that a large amount of variance in outcome remains to be explained by mechanisms that can protect against or exacerbate these early individual characteristics and environmental manifestations of risk suggests that during later childhood and early adolescence there are probabilities for meaningful redirection of the risk pathways. Analyses of the salient clusters and variables within clusters at these later time periods should provide further clarity to the relevant contributions for each outcome.

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Table 1

Significance of difference between hyperactive and control subjects on selected outcomes at age 17 based on two different methods of subject classification

	Outcomes at 17	Significance of F tests: Definition #1 - Hyperactive vs Controls	Definition #2 - Pervasive ADDH & Aggressiveness vs other symptom profiles	Significant Contrasts
Educational Outcomes	1. Attended special schools	17.64*	9.23**	1v5;2v5;3v5
	2. High school graduation or diploma	42.00**	10.25**	1v5;1v4;1v3;1v.
	3. Goes to college	34.34**	8.51**	1v5;1v4;1v3;1v.
Conduct problems	4. Left school or ran away	19.36**	5.16**	1v5
	5. Lives away from home, foster care, or other residential setting	17.47**	4.54**	1v5
	6. Court adjudicated deliquent	13.10**	6.49**	1v5;2v5
Mental Health	7. Conduct disorders - aggressiveness +	7.29**	4.02**	a
	8. Conduct disorders - nonaggressiveness +	3.10	5.36**	1v4;1v3
	9. Depression ++	2.34	1.82	
	10. In-patient or out-patient psychological treatment	8.18**	2.00	
Substance Use	11. Smokes cigarettes	6.25*	1.45	
	12. Use of hard liquor	.06	1.54	
	13. Use of marijuana	.27	2.31	
	14. Use of hard drugs	1.04	3.60**	1v4
	15. Poly drug use	.05	2.20	

* $p \leq .05$; ** $p \leq .01$

+ self report of acts and frequency of violence against people and property = aggressiveness

self report of acts and frequency of thefts, lying, truancy and rule violations not involving people = nonaggressiveness

++ score on Center for Epidemiological Studies Depression Inventory

+++ code for symptom groups for contrasts: 1= neither ADDH or Aggressive (A); 2= situational ADDH or Situational A; 3; Pervasive A; 4= Pervasive ADDH; 5 = Pervasive ADDH and A

a= groups 3, 4,5 together differ from group 1

Table 2. Pearson Correlations between Selected[a] Time 1 and 2 Predictors with Adolescent Educational Outcomes, Conduct Problems, Mental Health Difficulties, and Substance Use - Two Coefficients of Multiple Determination for Each of 9 Subclusters of Variables, Including Total Set of Predictors (R^2T) and Restricted Set of Starred Items (R^{2*}) Selected by Stepwise Multiple Regression.

Predictors	Educational Outcomes			Conduct Problems			Mental Health Difficulties				Substance Use				
	Attended Special School	High School Completed	Goes to College	Left School or Ran Away	Living Away from Home	Adjudicated Delinquent	Conduct Disorders-Aggressiveness	Conduct Disorders-Non-aggressiveness	Depression	Intensive Psychological Treatment	Cigarettes	Hard Liquor	Marijuana	Hard Drugs -	Poly Drug Use
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time 1 - Infancy and Pre-School Period															
A. Pregnancy Influences															
Gender							-.185	-.170	.116						
Young mother						.150									
Prematurity												.125	.145	.107	.273
Postmaturity	.136									.286					
Toxemia during pregnancy	.190							.118	.154	.190					-.144
Fetal distress during labor or birth												-.184	-.140	-.119	-.118
Long labor							.137	.198				.120	.186	.132	.196
Low birth weight			.116							-.159			.100		
Use of cigarettes during pregnancy			-.162		.173				.114		.171				
Use of beer or wine during pregnancy			.157		-.131										
Use of hard liquor during pregnancy				-.150	-.145	-.129	-.132								
Use of aspirin compounds during pregnancy					.169					.180					
Use of toxemia drugs during pregnancy									.121		.115		.108		
	.215		-.151				.156	.168							
R^2_T	.119	.054	.126	.097	.117	.087	.118	.163	.099	.160	.107	.139	.154	.115	.230
R^{2*}	.046	-	.095	.023	.076	.022	.098	.095	.042	.124	.029	.067	.123	--	.173

Table 2 (page 2)

Predictors	Educational Outcomes			Conduct Problems			Mental Health Difficulties				Substance Use				
	Attended Special School	High School Completed	Goes to College	Left School or Ran Away	Living Away from Home	Adjudicated Delinquent	Conduct Disorders-Aggressiveness	Conduct Disorders-Non-aggressiveness	Depression	Intensive Psychological Treatment	Cigarettes	Hard Liquor	Marijuana	Hard Drugs -	Poly Drug Use
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B. Child's Health and Temperament															
Health problems in infancy						-.079		-.048		.126					
Poor coordination			-.113	.116	.127	.169			.210		.143				
Speech problems					.154	.210				.192					
Delay in sitting up									-.159						
Number of serious accidents	.148	-.190	-.118	.168	.167	.174	.294	.287		.152	.214		.119	.193	.176
Number of surgeries	.130						.181	.209							
Little persistence		-.190	-.247		.123		.135							.135	
Low activity level		-.190		-.117			-.115		-.190		-.205	-.126	-.123		
Poor adaptability		-.286	-.156	.190	.188				-.138						
Moodiness						.128		.120	.212				.117		
R^2_T	.052	.137	.093	.086	.111	.144	.154	.160	.179	.081	.098	.064	.083	.091	-.102
R^{2*}	.022	.101	.061	.054	.035	.089	.086	.121	.125	.054	.074	-	-	.037	-.031
C. Family Characteristics and Stability															
Family disruption	.122	-.117			.148	.114	.159	.171			.112		.161		
Number of children at home			.158												
Number of schools child attended		-.157				.147	.170	.142		.159					
Number of prior moves		-.179	-.124		.178	.165				.132					
Ethnic status															
Low socioeconomic status			-.128		.148		.148	.163	.154		.122	.116		.143	
Single parent family	.114														
R^2_T	.042	.068	.074	.037	.083	.056	.077	.082	.040	.039	.043	.061	.051	.043	.037
R^{2*}	-	.032	.025	-	.050	.027	.054	.069	.024	.025	-	-	.026	.020	

Predictors	Educational Outcomes			Conduct Problems			Mental Health Difficulties				Substance Use				
Time 2 - Elementary School - Project Identification period	Attended Special School	High School Completed	Goes to College	Left School or Ran Away	Living Away from Home	Adjudicated Delinquent	Conduct Disorders-Aggressiveness	Conduct Disorders-Non-aggressiveness	Depression	Intensive Psychological Treatment	Cigarettes	Hard Liquor	Marijuana	Hard Drugs -	Poly Drug Use
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Environment and Familial Factors															
Low evaluation of academic competence			-.151	.146			.145	.120	.148		.169	.189	.127	.126	
Low aspirations for schooling									.138	.140					
Low involvement with child's reading		.130											.163		
Child shows little interest in reading	.209	-.299	-.248	.176	.196		.116		.153						
Little time devoted to child			-.122		.158		.120	.126					.102		
Little warmth and affection					.192									.117	
Little use of rational/social control discipline	-.223	.212	.195	-.139	-.218			-.129	-.185		-.154		-.159		
Little use of physical punishment discipline	-.128		.234												
Low level of demand for school behavior								-.149				-.144	-.186	.176	-.210
Little use of autocratic discipline practices		-.132													
Overprotectiveness			.124					.135			-.143	-.132		-.153	
Low evaluation of child's conscience development			-.142	.119		.145	.186	.140	-.156					.153	.125
R^2T	.132	.190	.221	.116	.179	.119	.112	.122	.136	.063	.117	.121	.155	.141	.094
R^{2*}	.076	.151	.126	.031	.137	.021	.035	.058	.076	.020	.046	.055	.106	.071	.044

Predictors	Educational Outcomes			Conduct Problems			Mental Health Difficulties				Substance Use				
	Attended Special School	High School Completed	Goes to College	Left School or Ran Away	Living Away from Home	Adjudicated Delinquent	Conduct Disorders - Aggressiveness	Conduct Disorders - Non-aggressiveness	Depression	Intensive Psychological Treatment	Cigarettes	Hard Liquor	Marijuana	Hard Drugs -	Poly Drug Use
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
E. Parent Legal Drug Use and Drug Attitudes at Time of Identification															
Parent use of sleeping pills					.162							.127			
Parent use of diet pills	.187		-.197									.136			
Positive attitude toward hyperactivity medication	.144	-.188	-.226		.164	.154									
Positive attitude toward teen drug use													-.163		
Favors liberal attitude toward laws for illegal drugs				-.157											
R^2T	.076	.050	.117	.048	.055	.041	.035	.026	.030	.013	.047	.053	.056	.018	.023
R^{2*}	.053	.035	.086	.025	.047	.024	-	-	-	-	-	.019	.027		-
F. Identification and Treatment for Hyperactivity															
Hyperactive by social system definers	.144	-.288	-.267	.196	.194	.177	.154			.122	.139				
Rated as pervasively aggressive	.237	-.346	-.230	.168	.247	.366	.129	.121		.251	.149		.133	.195	.243
Rated as pervasively overactive	.251	-.374		.226	.154	.254	.150	.150			.309	.145	.140		
Rated as pervasively ADD, not overactive		-.282	-.176	.207	.136	.149	.184	.171			.164	.181	.173	.139	.130
Age when symptoms first noted	.128	-.318	-.253	.182	.144	.127	.124		.128	.116	.157				
Age of first medication	.154	-.248	-.134	.145	.153	.207			.124	.150	.146			-.141	-.057
Age of first non-medical intervention	.158	-.274	-.193	.200	.261	.186				.203					
Number of years on medication	.213	-.207	-.229		.209	.224	.150	.151		.245	.137				
R^2T	.116	.212	.126	.094	.113	.172	.050	.056	.029	.129	.101	.053	.048	.055	.084
R^{2*}	.083	.198	.096	.078	.107	.153	.034	.029	-	.099	.095	.033	.030	.038	.078

Table 2 (page 5)

Predictors	Educational Outcomes			Conduct Problems			Mental Health Difficulties				Substance Use				
	Attended Special School	High School Completed	Goes to College	Left School or Ran Away	Living Away from Home	Adjudicated Delinquent	Conduct Disorders - Aggressiveness	Conduct Disorders - Non-aggressiveness	Depression	Intensive Psychological Treatment	Cigarettes	Hard Liquor	Marijuana	Hard Drugs -	Poly Drug Use
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3. Social relationships															
Others initiate play						-.123						-.156			
Joins in play											-.172				
Popular with peers	-.225	.157	.214	-.147	-.189	-.189	-.174	-.205		-.143	-.165	-.134	-.178	-.179	-.199
Negative self concept	.118			.147			.205	.202			.203	.177	.190	.224	.223
R^2_T	.061	.054	.057	.046	.061	.052	.084	.079	.021	.037	.081	.082	.065	.102	.103
R^{2*}	.051	.025	.046	.022	.036	.037	.042	.066	-	.021	.065	.055	.054	.050	.072
4. School behavior problems															
Many classroom adaptation problems		-.262	-.211	.160	.138	.186	.297	.290	.118		.205	.191	.246	.221	.176
Many interpersonal problems	.207	-.294	-.156	.191	.222	.264	.338	.369		.138	.226	.245	.346	.256	.282
Many intrapersonal problems		-.136		.188	.158	.176	.299	.250	.125	.123	.242	.125	.214	.142	.127
R^2_T	.049	.100	.047	.046	.054	.071	.132	.139	.032	.023	.070	.061	.120	.070	.081
R^{2*}	.043	.086	.044	.036	.049	.070	.132	.136	-	.019	.059	.060	.120	.066	.079
5. Cognitive and academic															
WISC IQ	.167	.220	.225	-.119	-.192				-.148		-.117				
PIAT	.144	.238	.309	-.136	.168				-.139						
Formal reasoning									-.157			.125			
Digit Span						-.158				-.125					
Coding	-.198	.317	.188		-.125	-.124									
R^2_T	.054	.129	.110	.022	.046	.044	.018	.027	.035	.031	.016	.061	.065	.045	.042
R^{2*}	.039	.121	.095	.019	.037	.025	-	-	.025	-	-	-	-	-	

Table 3 Increments in Variance explained by each of 9 successive clusters for Time 1 and Time 2 for Adolescent educational, conduct, mental health and substance use outcomes

Variance by Cluster	Educational Outcomes			Conduct Problems			Mental Health Difficulties				Substance Use				
	Attended Special School	High School Completed	Goes to College	Left School or Ran Away	Living Away from Home	Adjudicated Delinquent	Conduct Disorders Aggressiveness	Conduct Disorders Non-aggressiveness	Depression	Intensive Psychological Treatment	Cigarettes	Hard Liquor	Marijuana	Hard Drugs -	Poly Drug Use
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Added Variance due to each cluster															
Time 1 Infancy and pre-school															
Pregnancy influences	.046	---	.095	.023	.076	.022	.098	.095	.042	.124	.029	.067	.123	.049	.173
Child's health and temperament	.016	.101	.048	.047	.047	.089	.061	.090	.113	.038	.072	---	---	.042	.026
Family characteristics and stability	---	.019	.006	---	.023	.020	.017	.052	---	.020	---	---	.031	.016	---
R^2 Time 1	.062	.120	.149	.070	.145	.131	.193	.237	.154	.182	.101	.067	.155	.107	.199
Time 2 Elementary School															
Environment and familial factors	.053	.072	.073	.013	.022	.013	.020	.031	.028	.018	.032	.052	.075	.044	.016
Parent legal drug use and attitudes	.027	.010	.036	.026	.023	---	---	---	---	---	---	---	.012	---	---
Identification & treatment for hyperactivity	.020	.075	.015	.021	.026	.116	.002	.001	---	.038	.023	.007	.003	.022	.064
Social relationships	.008	.003	.003	.010	.002	.000	.013	.017	---	.000	.033	.018	.020	.018	.032
School behavior problems	.001	.011	.002	.003	.004	.001	.073	.046	---	.001	.025	.017	.051	.008	.009
Cognitive and academic status	.004	.023	.017	.000	.001	.017	---	---	.008	---	---	---	---	---	---
R^2 Time 2	.113	.194	.142	.073	.122	.150	.089	.095	.036	.057	.117	.095	.159	.092	.116
Total R^2	.175	.314	.291	.143	.272	.281	.282	.332	.190	.239	.218	.162	.314	.199	.315